

5 CLAIMS:

1. A method to identify sub-regions of a multi-channel image as containing red-eye comprising:

- 10 (a) converting said multi-channel image to a modified multi-channel image wherein at least one of said channels is an enhanced luminance channel that has more than 60% of the luminance information of said multi-channel image; and
- (b) identifying a sub-region of said image as containing a red-eye region based upon, at least in part, processing said enhanced luminance channel.

15 2. The method of claim 1 wherein said multi-channel image has red, green, and blue channels.

3. The method of claim 2 wherein said modified multi-channel image has hue, saturation, and intensity channels.

20 4. The method of claim 3 wherein saturation is the relative bandwidth of the visible output from a light source.

25 5. The method of claim 4 wherein said hue is substantially the wavelength within the visible-light spectrum at which the energy output from a source is the greatest.

- 5 6. The method of claim 1 wherein each channel of said multi-channel
image is processed differently to identify said sub-region of said image.
7. A method to identify sub-regions of a multi-channel image containing
red-eye comprising:
- 10 (a) providing said multi-channel image wherein at least one of said channels
has more than 60% of the luminance information of said multi-channel
image; and
- (b) identifying a sub-region of said image as containing a red-eye region
based upon, at least in part, processing said channel containing said
15 luminance information.
8. The method of claim 7 wherein said modified multi-channel image has
hue, saturation, and intensity channels.
- 20 9. The method of claim 8 wherein saturation is the relative bandwidth of
the visible output from a light source.
10. The method of claim 9 wherein said hue is substantially the wavelength
within the visible-light spectrum at which the energy output from a
25 source is the greatest.

5 11. The method of claim 7 wherein each channel of said multi-channel
image is processed differently to identify said sub-region of said image.

12. A method to identify sub-regions of a multi-channel image containing
red-eye comprising:

10 (a) identifying a sub-region of said image as containing a red-eye region
based upon, at least in part, different processing each of said channels of
said multi-channel image.

15 13. A method to identify sub-regions of a multi-channel image containing
red-eye comprising:

(a) providing said multi-channel image wherein at least one of said channels
has more than 60% of the luminance information of said multi-channel
image;

(b) identifying a sub-region of said image as containing a red-eye region
20 based upon, at least in part, processing said channel containing said
luminance information; and

(c) identifying said sub-region of said image as containing a red-eye region
based upon, at least in part, processing another one of said multi-channel
image.

- 5 14. The method of claim 13 wherein said identifying based upon said
 luminance information includes thresholding said luminance
 information.
- 10 15. The method of claim 14 wherein the result of said thresholding is a first
 mask.
16. The method of claim 14 wherein the value for said thresholding is based
 upon said image.
- 15 17. The method of claim 15 further comprising reducing the number of
 isolated pixels indicated within said image as a red-eye region.
18. The method of claim 17 further comprising using a convex hull
 technique to identify contiguous regions.
- 20 19. The method of claim 18 wherein contiguous regions of insufficient size
 are removed as potential red-eye regions.
20. A method to identify sub-regions of a multi-channel image containing
25 red-eye comprising:

- 5 (a) providing said multi-channel image wherein at least one of said channels substantially includes the hue of said image; and
- (b) identifying a sub-region of said image as containing a red-eye region based upon, at least in part, processing said channel that substantially includes said hue.

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21. The method of claim 20 wherein said red-eye region is based upon identifying a lighter region generally surrounded by a darker region.

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22. The method of claim 20 wherein said sub-region is identified based upon at least one of (1) its area, (2) its aspect ratio, and (3) its extent.

23. A method to identify sub-regions of a multi-channel image containing red-eye comprising:

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- (a) providing said multi-channel image wherein at least one of said channels substantially includes the saturation of said image; and
- (b) identifying a sub-region of said image as containing a red-eye region based upon, at least in part, processing said channel that substantially includes said saturation.

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24. The method of claim 23 wherein said red-eye region is based upon identifying location variations in said saturation.

- 5 25. The method of claim 24 wherein said location variations is based upon a statistical measure.
26. The method of claim 25 wherein said statistical measure is a standard deviation.